

CLAIMS

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

- 1 1. An adapter for enabling existing telephone equipment to be connected to a
2 Digital Subscriber Loop (DSL) link, the adapter being connected between a
3 telephone equipment and existing telephone wiring and communicating with
4 an Integrated Access Device (IAD) digitally, the IAD being connected to the
5 existing telephone wiring and controlling communications with each adapter.
- 1 2. The adapter recited in claim 1, wherein each adapter is assigned its own slot
2 in which data is transmitted and an additional slot, controlled by the IAD, is
3 devoted to control data.
- 1 3. The adapter recited in claim 2, wherein the slots assigned to the adapter
2 and the IAD are time slots.
- 1 4. The adapter recited in claim 2, wherein communication using the existing
2 wiring is above a spectrum assigned to DSL, the adapter including frequency
3 shifters for shifting frequencies of transmitted and received signals.
- 1 5. The adapter recited in claim 2, wherein voice data is transmitted using Pulse
2 Code Modulation (PCM).
- 1 6. The adapter recited in claim 2, further comprising:
2 line bridge making a connection to the existing telephone wiring;
3 phone Digital Access Arrangement(DAA) making a connection to the
4 telephone equipment;

5 a first analog-to-digital (A/D) converter connected to the DAA, an
6 analog signal from the telephone equipment being sampled and buffered by
7 the first A/D converter to produce a digital signal;
8 an encoder connected to receive an output signal from the first A/D
9 converter and providing an encoded output;
10 a first digital-to-analog (D/A) converter connected to the encoder and
11 generating an analog signal;
12 a first frequency shifter connected to the first D/A converter shifting
13 the analog signal into a digital voice band;
14 a first filter connected between the first frequency shifter and the line
15 bridge for filtering the shifted analog signal before going out on the telephone
16 line via line;
17 a second filter connected to the line bridge for filtering an incoming
18 analog signal from the line bridge in order to extract a digital voice band
19 signal;
20 a second frequency shifter connected to the second filter for down
21 shifting the filtered signal to base band;
22 a second A/D converter connected to the second frequency shifter
23 converting shifted signal to a digital domain;
24 a decoder connected to the second A/D converter for decoding the
25 converted signal; and
26 a second D/A converter connected between the decoder and the DAA
27 for converting the digital signal to an analog signal supplied to the telephone
28 equipment.

1 7. The adapter recited in claim 6, further comprising:

2 a burst transmitter connected to receive the digital signal from the A/D
3 converter and supply an output to the encoder; and
4 a burst receiver connected to the decoder and providing an output to

5 the second D/A converter.

1 8. The adapter recited in claim 7, wherein the burst transceiver, the encoder,
2 the decoder, and the burst receiver are implemented in a Digital Signal
3 Processor (DSP), the DSP including control logic which monitors the line and
4 synchronizes bursts of incoming and outgoing symbols.

1 9. The adapter recited in claim 8, wherein the control logic enables the IAD to
2 control each adapter through information sent during the control slot and
3 acknowledges information received for the adapter.

1 10. The adapter recited in claim 7, wherein the encoder produces the digital
2 Quadrature Amplitude Modulation (QAM) symbols and the decoder decodes
3 QAM symbols.